

User Manual

Installation

Industrial ETHERNET Switch MICE MS20/MS30



MICE MS20



MICE MS30

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Safety instructions

This manual contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices and machinery.

■ Certified usage

Please observe the following: The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by Hirschmann. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

■ Supply voltage

The devices are designed for operation with a safety extra-low voltage. Thus, they may only be connected to the supply voltage connections and to the signal contact with PELV circuits or alternatively SELV circuits with the voltage restrictions in accordance with IEC/EN 60950. The supply voltage is electrically isolated from the housing.

☐ Use only undamaged parts!

☐ Relevant for North America:

The subject unit is to be supplied by a Class 2 power source complying with the requirements of the National Electrical Code, table 11(b). If power is redundant supplied (two individual power sources) the power sources together should comply with the requirements of the National Electrical Code, table 11 (b).

☐ Relevant for North America:

Use 60/75°C or 75°C copper(CU)wire only.

☐ Relevant for North America

for devices certified for hazardous locations:

Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods [Article 501-4(b) of the National Electrical Code, NFPA 70] and in accordance with the authority having jurisdiction.

■ Shielding ground

The shielding ground of the connectable twisted pairs lines is connected to the front panel as a conductor.

☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

■ Housing

Only technicians authorized by Hirschmann are permitted to open the housing.

The lower covering panel of the MICE housing is grounded by the DIN rail and, as an option, by the separate ground screw.

The switch basic module forms an inseparable unity. By removing the display and connecting parts, you risk the damage of the switch basic module.

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.
- ☐ The ventilation slits must not be covered to ensure free air circulation.
- ☐ The distance to the ventilation slots of the housing has to be a minimum of 10 cm.
- ☐ Never insert pointed objects (thin screwdrivers, wires, etc.) into the inside of the subrack! Failure to observe this point may result in injuries caused by electric shocks.
- ☐ The device has to be mounted in an upright position (see Fig. 13).
- ☐ If installed in a living area or office environment, the device must be operated exclusively in switch cabinets with fire protection characteristics according to EN 60950.

■ Environment

The device may only be operated in the listed maximum surrounding air temperature range at the listed relative air humidity range (non-condensing).

- ☐ The installation location is to be selected so as to ensure compliance with the climatic limits listed in the Technical Data.
- ☐ To be used in a Pollution Degree listed in the Technical Data.

■ Qualification requirements for personnel

Qualified personnel as understood in this manual and the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

- ▶ trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;
- ▶ trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
- ▶ trained in providing first aid.

■ General Safety Instructions

This device is electrically operated. Adhere strictly to the safety requirements relating to voltages applied to the device as described in the operating instructions!

Failure to observe the information given in the warnings could result in serious injury and/or major damage.

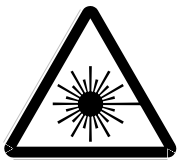
- ☐ Only personnel that have received appropriate training should operate this device or work in its immediate vicinity. The personnel must be fully familiar with all of the warnings and maintenance measures in these operating instructions.
- ☐ Correct transport, storage, and assembly as well as careful operation and maintenance are essential in ensuring safe and reliable operation of this device.
- ☐ Only use undamaged parts!
- ☐ These products are only to be used in the manner indicated in this version of the manual.
- ☐ Any work that may have to be performed on the electrical installation should be performed by fully qualified technicians only.

Warning!

LED- or LASER components according to IEC 60825-1 (2001):

CLASS 1 LASER PRODUCT.

LIGHT EMITTING DIODE - CLASS 1 LED PRODUCT.



Warning (MM2 - 2FXP4, MM3 - 4FXP4)

LED LIGHT

DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS (e.g. lens, microscope).

Failure to observe this warning within a distance of 100 mm can endanger your eyes. Light is emitted from the optical connections or from the ends of the optical fibers that are connected to them. Light Emitting Diode CLASS 2M, Wave length 650 nm, Power <2 mW, according to IEC/CEI 60825-1:2003-10.

■ National and international safety regulations

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

- ESD guidelines (MM2 - 2FXP4, MM3 - 4FXP4)
The media modules MM2-2FXP4 and MM3-4FXP4 contain components highly sensitive to electrostatic fields. These components can be easily destroyed or have their lives shortened by an electrical field or by a discharge caused by touching the contacts. You can find more information about devices vulnerable to electrostatic fields in DIN EN 61340-5-1 (2001-08) and DIN EN 61340-5-2 (2002-01).

- Note on the CE marking
The devices comply with the regulations contained in the following European directives:

89/336/EEC

Directive of the council for standardizing the regulations of member states on electromagnetic compatibility (changed by RL 91/263/EEC, 92/31/EEC and 93/68/EEC).

In accordance with the above-named EU directives, the EU conformity declaration will be at the disposal of the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Straße 45-51
D-72654 Neckartenzlingen
Germany
Phone ++49 7127 14 1480

The product can be used in living areas (living area, place of business, small business) and in industrial areas.

- ▶ Interference immunity: EN 61000-6-2:2001
- ▶ Emitted interference: EN 55022:1998 + A1 2000 + A2 2003 Class A

Warning!

This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC value limits.

■ FCC note:

Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.

These requirements are designed to provide sufficient protection against interference where the device is being used in a business environment. The device creates and uses high frequencies and can radiate same, and if it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a living area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

■ Recycling note:

After usage, this product must be disposed of properly as electronic waste in accordance with the current disposal regulations of your county / state / country.

About this manual

The following manuals are included as PDF files on the enclosed CD ROM:

- ▶ User manual "Installation"
- ▶ User manual "Basic configuration"
- ▶ User manual "Redundancy configuration"
- ▶ Reference manual "Web-based Interface" and
- ▶ Reference manual "Command Line Interface"

If you use Network Management Software HiVision you have further opportunities to:

- ▶ have an event logbook.
- ▶ configure the "System Location" and "System Name".
- ▶ configure the network address range and SNMP parameters.
- ▶ save the configuration on the Switch.
- ▶ simultaneous configuration of several Switches.
- ▶ configure the relevant ports to be displayed red if there is no link state.

Legend

The commendations used in this manual have the following meanings:

-
- ▶ Listing
 - Work step
 - Subheading
-

1 Device description

The MS20/MS30 devices consist of a switch with media modules that can be plugged into it. They allow you to construct switched industrial ETHERNET networks that conform to the IEEE 802. and 802.3u standards using copper wires or optical fibers in a bus or ring topology. You can connect terminal devices and other infrastructure components via twisted pair cables, multi-mode LWL and single-mode LWL. The twisted pair ports support autocrossing, autonegotiation and autopolarity.



The MS20/MS30 devices provide you with a range of switch variants. You can set up your switch to meet your individual requirements with regard to the transmission media type, the number of 10/100 Mbit ports you want (8, 16 or 24), the number of 1000 Mbit ports (up to 2), the temperature range, voltage range, certificates and software variant.

The MS20/MS30 devices are modular network components. They are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility. The devices operate without fans and have a redundant voltage supply. The switches are very quickly mounted by snapping them onto a hat rail, which also automatically contacts the function ground.

The HIPER-Ring redundancy concept enables you to quickly carry out a re-configuration, and also a simple configuration with only one additional connection. The diagnosis display and the display of the operating parameters and the large label areas provide a quick overview.

It can be easily managed via a Web browser, via Telnet, with a management software product (such as *HiVision*) or locally on the switch (V.24 interface).

Depending on the software you choose, the MS20/MS30 devices provide you with a large range of functions:

- ▶ Redundancy functions
(Rapid Spanning Tree, Redundant Ring Structure, HIPER-Ring, Redundant Coupling, Link Aggregation, Redundant Power Supply)
- ▶ Protection from unauthorized access
- ▶ Synchronized system time in the network
- ▶ Network load control
- ▶ Function diagnosis
- ▶ Diagnostics (hardware self-testing)
- ▶ Reset
- ▶ Priority
- ▶ VLAN
- ▶ Topology recognition
- ▶ Web-based interface
- ▶ Command Line Interface - CLI
- ▶ SNMP
- ▶ 802.1x port authentication
- ▶ Real Time Clock (Professional software variant)

The addition, to the MS20/MS30 MICE range, of the RS20/RS30 Open Rail range of switches, the MACH range of backbone switches, the BAT wireless transmission system, the EAGLE security system, and products for the LION control room, provides continuous communication across all levels of the company.

1.1 Description of the device variants

The industrial ETHERNET series MICE (Modular Industrial Communication Equipment) consists of a basic switch module and the media modules. These devices can be managed. A basic module contains all the functions of this industrial Gerät, with the exception of the interfaces to the LAN that is connected. Pluggable media modules provide these interfaces. They differ with regard to the number of interfaces and the media type for connecting segments. An expansion module enables you to add 2 slots for media modules to the basic module.

For the sake of simplicity, the basic switch module with various plugged in media modules will be referred to as MICE in this document.

- ▶ The MS20-... device variants are modular switches with up to 8, 16 or 24 * 10/100 Mbit Ethernet ports. You can choose the media for the ports via the media modules.

- ▶ The MS30-... device variants are modular switches with up to 8, 16 or 24 * 10/100 Mbit Ethernet ports and up to 2 additional Gigabit ports (1000 Mbit Ethernet). You can choose the media for the ports via the media modules.

The devices also provide you with the following options for selecting the variant you desire:

- ▶ Temperature range:
 - ▶ Standard (0 °C to +60 °C)
 - ▶ Extended (-40 °C to +70 °C) without conformal coating
 - ▶ Extended (-40 °C to +70 °C) with conformal coating
- ▶ Voltage range:
 - ▶ 18 to 32 VDC (flatter basic module design)
 - ▶ 18 to 60 VDC (deeper basic module design)
- ▶ Certifications:
 - ▶ CE, UL
 - ▶ CE, UL, German Lloyd (GL), IEC 61850 Declaration (Sub Station), IEEE 1613 (Sub Station), EN 50121-4 Railway (along track)
 - ▶ CE, UL, German Lloyd (GL), IEC 61850 Declaration (Sub Station), IEEE 1613 (Sub Station), EN 50121-4 Railway (along track), EN 50155 Declaration (Railway) and ATEX 100a (Hazardous Location)
- ▶ Software version: Enhanced or Professional

The devices comply with the specifications of the standards:
 ISO/IEC 8802-3u 100BASE-TX/-1000BASE-T,
 ISO/IEC 8802-3 100BASE-FX and
 ISO/IEC 8802-3 1000BASE-SX/LX.

The basic module of the MICE contains all the function units, such as: switch function, management function, redundancy function, display control, voltage connection, management connection, adjustable controls, slots for media modules.

Family	Designed for
MS20	Larger numbers of ports, number of 100 Mbit ports desired, temperature range, voltage range, certificates and software variant can be selected
MS30	Larger numbers of ports and larger bandwidth requirement, number of 100/1000 Mbit ports desired, temperature range, voltage range, certificates and software variant can be selected

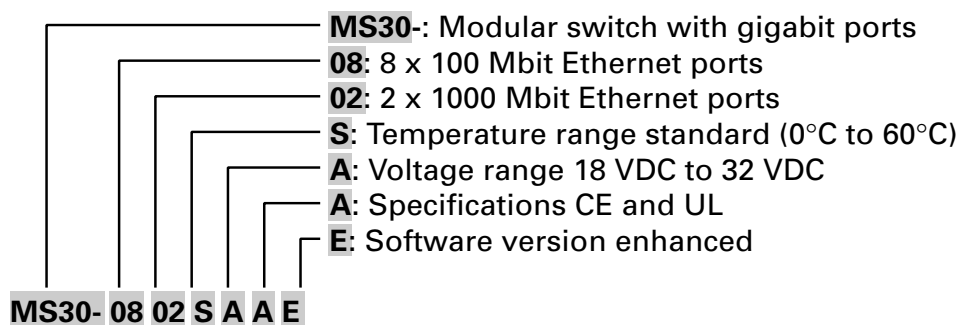
1.1.1 MS20-... /MS30-... combination options

The product designation of your MS20/MS30 device is made from combining the desired product characteristics in accordance with the following table. The short designation is in column 3.

Position	Attribute	Ident.	Feature
1 to 4	Produkt	MS20	Modular Switch without gigabit ports
		MS30	Modular Switch with gigabit ports
5	- (hyphen)	-	
6 to 7	Number of 10/100 Mbit ports	08	8 * 10/100 Mbit Ethernet
		16	16 * 10/100 Mbit Ethernet
		24	24 * 10/100 Mbit Ethernet
8 and 9	Number of 1000 Mbit ports	00	0 * 1000 Mbit Ethernet
		02	2 * 1000 Mbit Ethernet
14	Temperature range	S	Standard 0 °C to +60 °C
		T	Extended -40 °C to +70 °C
		E	Extended -40 °C to +70 °C, conformal coating
15	Voltage range	A	18 VDC to 32 VDC
		C	18 VDC to 60 VDC
16	Specifications	A	CE, UL
		H	CE, UL, GL, railway (along track), sub station
		B	CE, UL, GL, railway (along track), sub station, hazardous location (ATEX), railway (train)
17	Software version	E	Enhanced
		P	Professional

Table 1: Combination options of the MS20/MS30 device versions

■ Example: MS30-0802SAAE



1.1.2 Number of ports and media

- Device versions with 10/100 Mbit ports
MS20-0800..., MS20-1600..., MS20-2400...

Depending on the variant, the MS20 basic modules provide you with the following number of slots for media modules and the following maximum number of connectable network segments:

Basic module	Number of slots for 10/100 Mbit media modules	Maximum number of connectable 10/100 Mbit network segments when connecting 4 port media modules
MS20-0800...	2	8
MS20-1600...	4	16 ¹⁾
MS20-2400...	6	24

¹⁾ Expandable to 24 ports with MB2-T expansion module

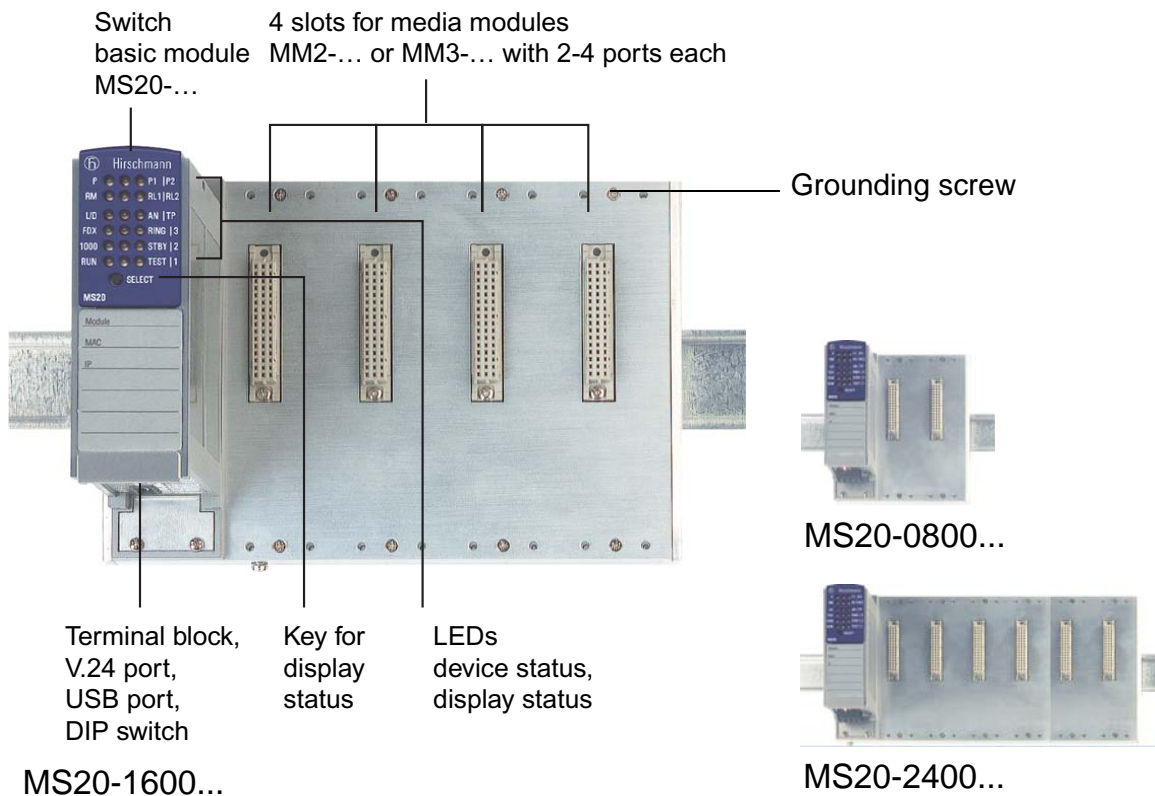


Fig. 1: Overview interfaces, display elements and controls of the MS20 -...

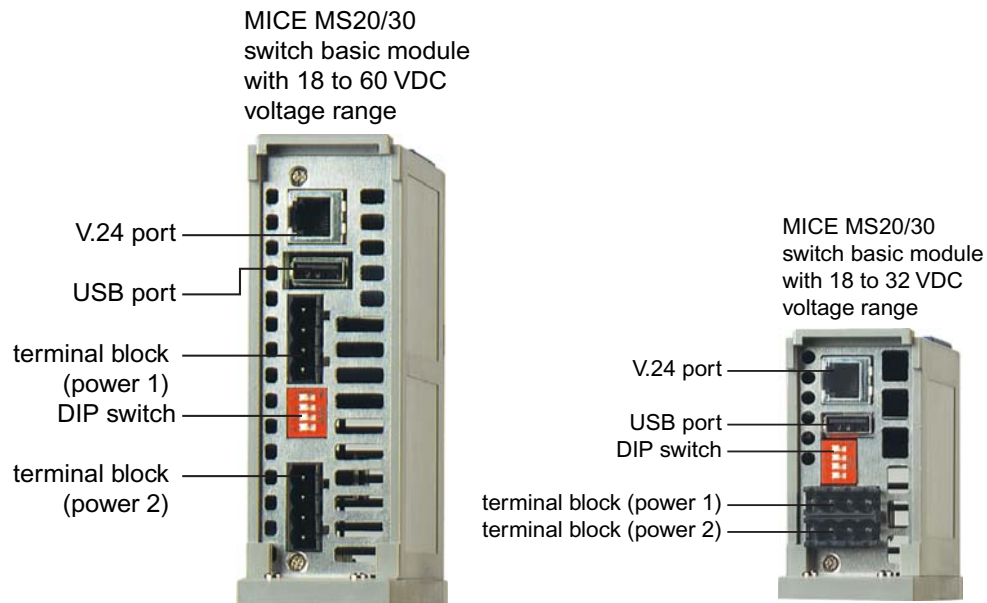


Fig. 2: Interfaces of the MS20-... and MS30-... on the bottom of the device

- Device versions with 1000 Mbit and 10/100 Mbit ports
MS30-0802..., MS30-1602..., MS30-2402...

Depending on the model, the MS30 basic modules offer you the following number of slots for media modules and the following maximum amount of connectable network segments:

Basic module	Number of slots for 10/100 Mbit media modules	Number of slots for 1000 Mbit media modules	Maximum number of connectable 10/100 Mbit network segments when connecting 4 port media modules	Maximum amount of connectable 1000 Mbit network segments
MS30-0802...	2	1	8	2
MS30-1602...	4	1	16 ¹⁾	2
MS30-2402...	6	1	24	2

¹⁾ Expandable to 24 ports with MB2-T expansion module

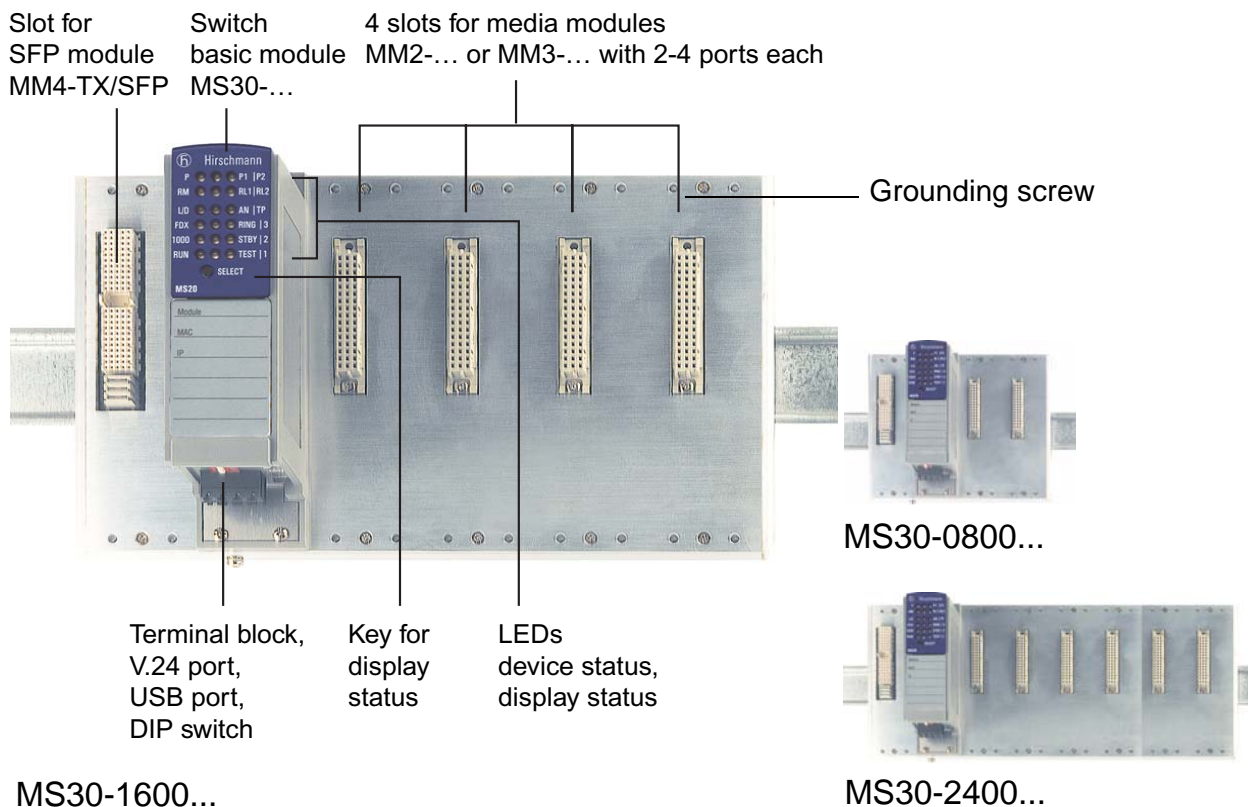


Fig. 3: Overview interfaces, display elements and controls of the MS30

The figure “Interfaces of the MS20-... and MS30-... on the bottom of the device” on page 15 illustrates the interfaces on the bottom of the MS30 device.

1.1.3 Media modules

The MICE media modules form the interface of the device to the LAN. They can be attached in the

- Basic module MS20-...
- Basic module MS30-...

They differ with regard to the number of interfaces and media type. The various interfaces of the MICE media modules offer you the following interface-specific functions:

- Specific functions of the TP/TX interface
 - Link Control
 - Auto Polarity Exchange
 - Autonegotiation
 - Autocrossing (it does not matter whether you connect devices using a cross-over or straight cable)
- Specific functions of the F/O interface
 - Link control
- Transceiver- (AUI-) specific functions

- ▶ Collision detection
- ▶ Collision Test (SQE)
- ▶ Jabber-Control
- ▶ DTEPower monitor

■ MICE 2000 media modules

MICE 2000 media modules							
Module type	AUI port	TP ports 10/100	F/O port multi-mode 10 MBit/s	F/O port multi-mode POF 100 MBit/s	F/O port multi-mode 100 MBit/s	F/O port single-mode 1300 nm, 100 MBit/s	F/O port single-mode 1550 nm, 100 MBit/s
MM2 - 4TX1 (- EEC)	—	4, RJ45	—	—	—	—	—
MM2 - 2FLM4	—	—	2, ST	—	—	—	—
MM2 - 2FXP4	—	—	—	2, ST	—	—	—
MM2 - 4FXM3	—	—	—	—	4, MTRJ	—	—
MM2 - 2FXM3 / 2TX1	—	2, RJ45	—	—	2, MTRJ	—	—
MM2 - 2FXM2	—	—	—	—	2, DSC	—	—
MM2 - 2FXS2	—	—	—	—	—	2, DSC	—

Table 2: Media connectors each MICE 2000 media module (number and kind)

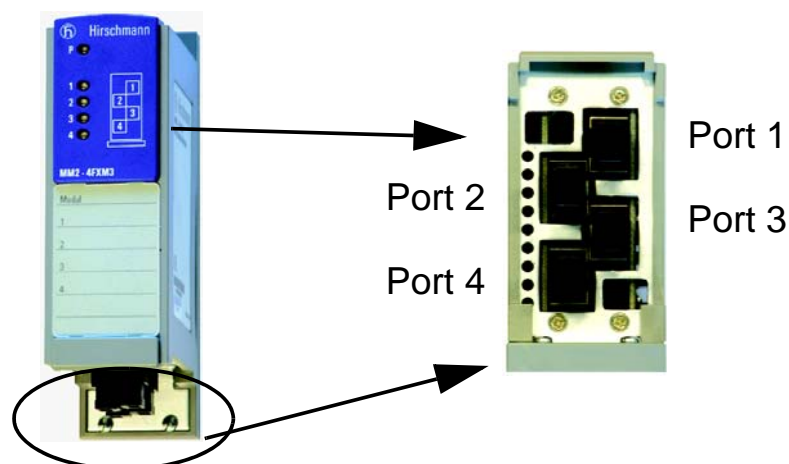


Fig. 4: Port assignment

■ MICE 3000 media modules

MICE 3000 media modules							
Module type	AUI port	TP ports 10/100	F/O port multi- mode 10 MBit/s	F/O port multi- mode POF 100 MBit/s	F/O port multi- mode 100 MBit/s	F/O port single- mode 1300 nm, 100 MBit/s	F/O port single- mode 1550 nm, 100 MBit/s
MM3-2AUI	2, Sub-D	—	—	—	—	—	—
MM3-4TX5	—	4, M12	—	—	—	—	—
MM3-4TX1-RT	—	4, RJ45	—	—	—	—	—
MM3-2FLM4/2TX1-RT	—	2, RJ45	2, ST	—	—	—	—
MM3-4FLM4	—	—	4, ST	—	—	—	—
MM3-4FXP4	—	—	—	4, ST	—	—	—
MM3-1FXM2/3TX1	—	3, RJ45	—	—	1, DSC	—	—
MM3-2FXM2/2TX1(-EEC)	—	2, RJ45	—	—	2, DSC	—	—
MM3-2FXM2/2TX1-RT	—	2, RJ45	—	—	2, DSC	—	—
MM3-2FXM4/2TX1	—	2, RJ45	—	—	2, ST	—	—
MM3-4FXM2	—	—	—	—	4, DSC	—	—
MM3-4FXM4	—	—	—	—	4, ST	—	—
MM3-1FXS2/3TX1(-EEC)	—	3, RJ45	—	—	—	1, DSC	—
MM3-2FXS2/2TX1	—	2, RJ45	—	—	—	2, DSC	—
MM3-2FXS2/2TX1-RT	—	2, RJ45	—	—	—	2, DSC	—
MM3-4FXS2	—	—	—	—	—	4, DSC	—
MM3-1FXL2/3TX1	—	3, RJ45	—	—	—	—	1, DSC

Table 3: Media connectors each MICE 3000 media module (number and kind)

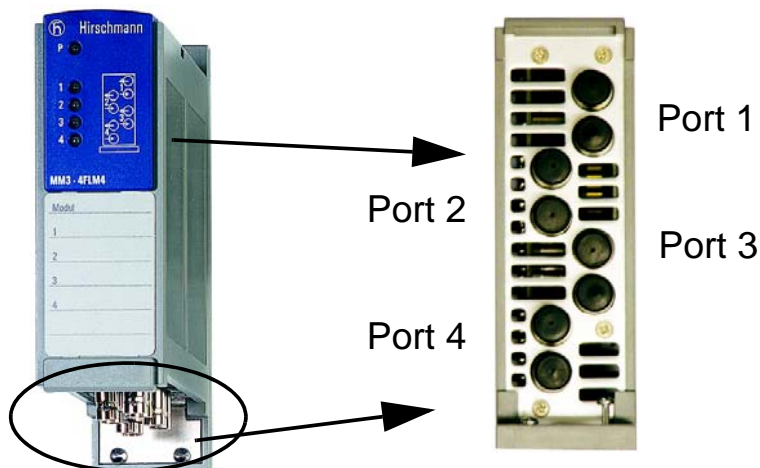


Fig. 5: Port assignment

■ MICE 4000 media modules

The 2-port media module MM4 - 2TX/SFP has two TP interfaces and two sockets for Hirschmann SFP modules.

The 4-port media module MM4 - 4TX/SFP can also be used in the MS20/MS30. It has four TP interfaces and four sockets for Hirschmann SFP modules. The MS30 gigabit slot (slot on the left side of the switch basic module) provides two ports.

Every slot allows you to replace a TP interface by a F/O interface using a SFP module. Inserting the SFP module deactivates the corresponding TP interface.

Note: Only use SFP modules from Hirschmann.

MICE 4000 media modules	TP ports 10/100/1000	SFP ports alternativ to TP ports
Module type		
MM4 - 2TX/SFP	2, RJ45	2
MM4 - 4TX/SFP	4, RJ45	4

Table 4: Media connectors each MICE 4000 media module (number and kind)

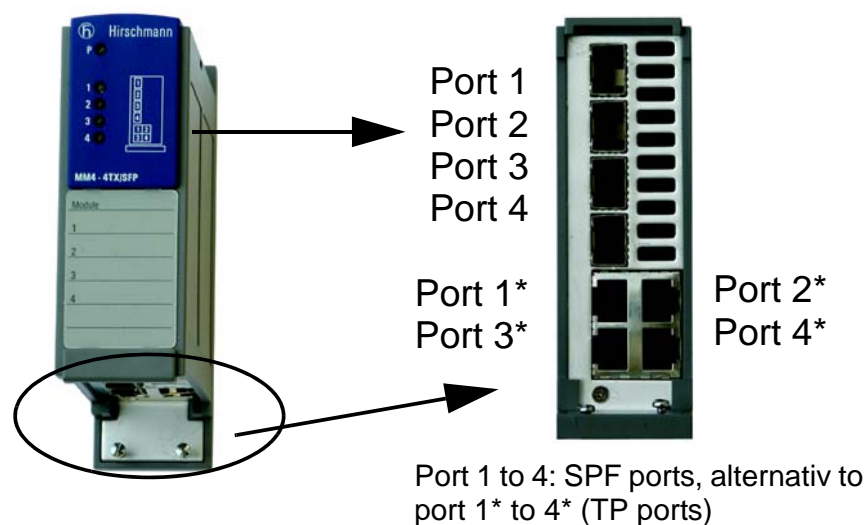


Fig. 6: Port assignment

1.1.4 MB - 2T expansion module

The MB-2T expansion module allows you to add 2 slots to the MICE MS20-1600 / MS30-1602 basic modules for installing media modules.

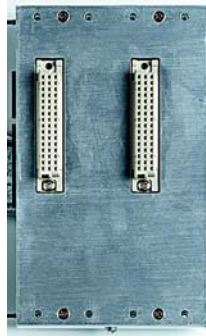


Fig. 7: MB - 2T expansion module

1.1.5 SFP module

SFP modules are optical transceivers. SFP stands for Small Form-factor Pluggable and is often named mini-GBIC (GigaBit Interface Converter).

They are plugged onto the special ports of the MICE 4000 media modules MM4-2TX/SFP (or MM4-4TX/SFP) to provide a F/O port. Inserting the SFP module deactivates the corresponding TP interface.

Module type	Transmission	Expansion	Connector
M-SFP-SX/LC	850 nm multimode	0,55 km	LC
M-SFP-LX/LC	1330 nm multimode	0,55 km	LC
	1330 nm singlemode	20 km	LC
M-SFP-LH/LC	Long haul	8-72 km	LC
M-SFP-LH+/LC	Long haul +	60-120 km	LC

Table 5: SFP modules

2 Assembly and startup procedure

The Industrial ETHERNET Modular Industrial Communication Equipment (MICE) Family has been developed for practical application in a harsh industrial environment. Accordingly, the installation process has been kept simple. On delivery, the device is ready for operation.

The following procedure is appropriate for assembly:

- ▶ Unpacking and checking
- ▶ Assembling the media modules
- ▶ Filling out and attaching the labels
- ▶ Assembling the SFP modules
- ▶ Adjusting the DIP switch settings on the basic module
- ▶ Adjusting the DIP switch settings on the MICE MM3-2AUI media module (if existent)
- ▶ Connecting the terminal block for supply voltage and signal contact, connecting the supply voltage
- ▶ Assembling the terminal block, startup procedure
- ▶ Assembling the device on the ISO/DIN rail, grounding
- ▶ Connecting the data lines
- ▶ Assembling the expansion module

2.1 Device installation

2.1.1 Unpacking and checking

- ☐ Check whether the package was delivered complete, see [“Scope of delivery” on page 41](#).
- ☐ Check the individual parts for transport damage.

2.1.2 Assembling the media modules

On delivery, the device is ready for operation. Media modules can be assembled and disassembled during running operation.

- ☐ To fasten a media module, first remove the protective cap over the plug.
- ☐ Plug the media module onto the plug.
- ☐ Tighten the 4 screws on the corners of the media module.
- ☐ Fit the media modules one after the other from the left to the right.
- ☐ Check whether the switch pre-setting suits your requirements.

2.1.3 Filling out and attaching the labels

The labels included in the delivery help you to structure your network installation clearly.

The large label areas enable you to designate the modules and uniquely assign the devices to be connected. You can print them, write on them and exchange them at any time.



Fig. 8: Attaching the labels

Label on the basic module:

- Name of the module
- MAC address of the device
- IP address of the device
- Other entries on your demand

Labels on the media modules:

- Name of the module
- Port assignment of the module each port

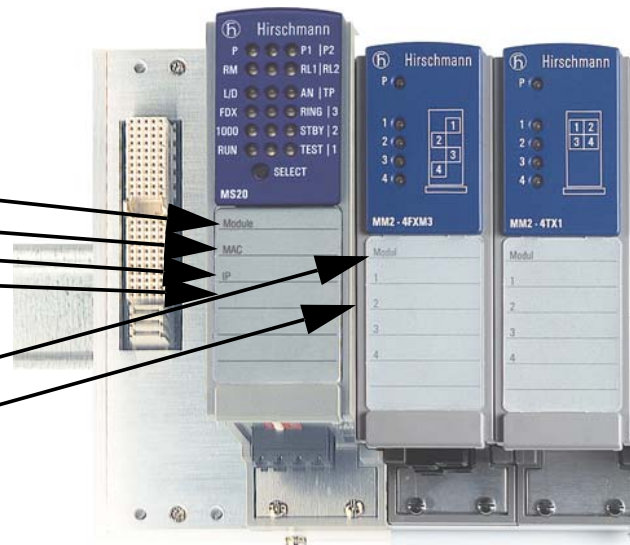


Fig. 9: Labels for basic module and media modules

- ☐ Attach the labels included in the delivery to the basic module and the media modules as required.

2.1.4 Assembling the SFP modules

- ☐ To fasten a SFP module, first remove the protective cap over the socket.
- ☐ Insert the SFP module with the closed lock into the socket until you hear it snap in.

Note: Only use SFP modules from Hirschmann.

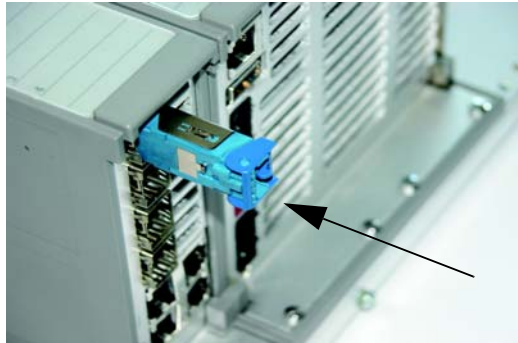


Fig. 10: Installation SFP module

2.1.5 Adjusting the DIP switch settings on the basic module

The 4-pin DIP switch in the bottom panel of the basic module provides you with the following options:

DIP switch	Function	State of delivery
RM (Redundancy Manager) ²⁾	When the HIPER-Ring function is switched on, you can switch the RM (Redundancy Manager) function on and off (see "User Manual - Redundancy Configuration").	position OFF (RM function not active)
Ring port ¹⁾	Selecting the ports for the HIPER-Ring. MS30: In the ON position, ports 1 and 2 in module 2 are for connecting the HIPER-Ring. MS20: In the ON position, port 1 from modules 1 and 2 are for connecting the HIPER-Ring.	position OFF (ports 1 and 2 of module 1 are for connecting the HIPER-Ring)
Stand-by ²⁾	With the redundant coupling of rings, you assign the redundancy function to the MICE in the redundant line (see "User Manual - Redundancy Configuration").	position OFF (normal function)
Software Configuration / DIP Configuration	Give the software configuration priority ahead of the DIP switch position. In this case, the other switch positions are meaningless.	position OFF (software configuration has priority)

1) You use the “Ringport” switch on the 4-pin DIP switch to select the ring ports for the HIPER-Ring:

MICE device	DIP switch “Ring-Port”	Ring ports for HIPER-Ring
MS20	OFF	module 1/ port 1 and module 1/ port 2
MS20	ON	module 1/ port 1 and module 2/ port 1
MS30	OFF	module 1/ port 1 and module 1/ port 2
MS30	ON	module 2/ port 1 and module 2/ port 2

2) You use the “RM” and “Stand-by” switches on the 4-pin DIP switch to switch the following functions on and off:

Switch “RM”	Switch “Stand-by”	Ring redundancy	Ring coupling	Redun-dancy Manager	Ring port	Control port	Coupling port
OFF	OFF	an	off	off	see above		
ON	OFF	on	off	on	see above		
OFF	ON	on	on	off	see above	module 1/ port 3 (MS20) module 2/ port 3 (MS30)	module 1/ port 4 (MS20) module 2/ port 4 (MS30)
ON	ON	off	off	off			

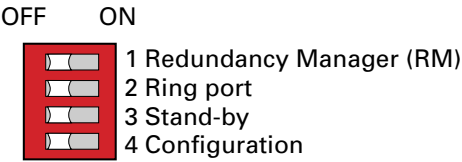


Fig. 11: 4-pin DIP switch on the MICE MS20-.../MS30-... basic module

☐ Check whether the switch default settings match your requirements before starting the device.

2.1.6 Adjusting the DIP switch settings on the MICE MM3-2AUI media module (if existent)

With the 3-pin DIP switch in the lower panel of the MM3 -2AUI media module, you enter settings for the SQE test function and for monitoring the DTE voltage.

Note: Before starting operation, check whether the device in question operates the transceiver with or without an SQE test.

☐ Before starting operation of the device, check whether the default settings of the DIP switch correspond to your requirements.

2.1.7 Terminal block for supply voltage and signal contact

The supply voltage and the signal contacts are connected via a 4-pin terminal block with snap locking.

■ Supply voltage

The supply voltage can be connected redundantly. Both inputs are uncoupled. With redundant supply, the transformer supplies the device alone with the higher output voltage. The supply voltage is electrically isolated from the housing.

Note: With non-redundant supply of the mains voltage, the device reports a power failure. You can prevent this message by applying the supply voltage over the two inputs or by changing the configuration via management.

■ Signal contacts

- ▶ The signal contacts monitor proper functioning of the device, thus enabling remote diagnostics. You can specify the type of function monitoring in the Management.
- ▶ You can also use the Management to set the signal contact manually and thus control external devices.

A break in contact is reported via the potential-free signal contact (relay contact, closed circuit):

- ▶ The failure of at least one of the two supply voltages (supply voltage 1 or 2 < 18 V).
- ▶ A continuous malfunction in the device (internal 3.3 VDC voltage).
- ▶ The defective link status of at least one port. With the device, the indication of link status can be masked by the management for each port. Link status is not monitored in the delivery condition.
- ▶ The loss of Redundancy guarantee.
- ▶ Error during self-test.

The following conditions are reported in stand-by mode

- ▶ Control cable disrupted
- ▶ Control cable shorted
- ▶ Partner device is in stand-by mode

The following conditions are reported in normal mode:

- ▶ Control cable shorted
- ▶ Partner device is in normal mode

The following condition is reported in RM mode additionally:

- Ring redundancy guaranteed. Ring redundancy is not monitored in the delivery condition.

2.1.8 Connecting the terminal blocks, startup procedure

- ☐ Pull the terminal blocks off the device and connect the power supply and signal lines.

MICE MS20/30
switch basic module
with 18 to 60 VDC
voltage range



Power/signal contact 1:
1 = +24 V (P1)
2 = 0 V
3,4 = Relay 1

Power/signal contact 2:
1 = +24 V (P2)
2 = 0 V
3,4 = Relay 2

MICE MS20/30
switch basic module
with 18 to 32 VDC
voltage range



Power/signal contact 1:
1 = +24 V (P1)
2 = 0 V
3,4 = Relay 1

Power/signal contact 2:
1 = +24 V (P2)
2 = 0 V
3,4 = Relay 2

Fig. 12: Pin assignment of the 4-pin signal contact

- ☐ Mount the terminal block for the supply voltage and the signal contact on the front of the device. Make sure that the snap lock snaps into place.

By connecting the supply voltage at the terminal block, you start the operation of the device.

2.1.9 Assembling the device on the ISO/DIN rail, grounding

- ☐ You mount the device on a 35 mm hat rail according to DIN EN 60175.
- ☐ Attach the upper snap-in guide of the device into the hat rail and press it down against the DIN rail until it snaps into place.

Note: The shielding ground of the connectable twisted pair lines is connected to the lower panel as a conductor.

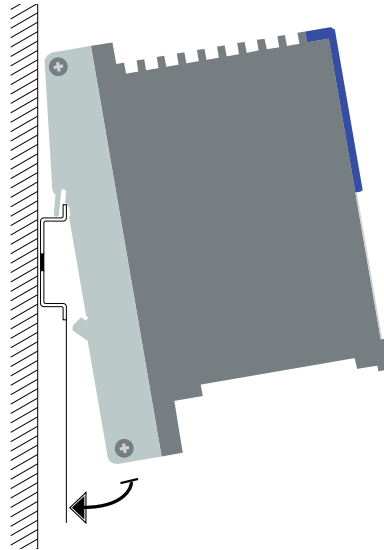


Fig. 13: Assembly

■ Grounding

The grounding of the lower panel of the housing of the device is effected with the hat rail and, optionally, with the separate ground screw (see Fig. [“Overview interfaces, display elements and controls of the MS20 -...”](#) on page 14).

2.1.10 Connecting the data lines

■ 10/100 Mbit/s twisted pair connection

10/100 Mbit/s ports (RJ45 or M12 sockets) enable the connection of terminal devices or independent network segments in compliance with the IEEE 802.3 100BASE-TX / 10BASE-T standards. These ports support:

- ▶ autonegotiation
- ▶ autopolarity
- ▶ autocrossing (when autonegotiation is switched on)
- ▶ 100 Mbit/s half duplex mode, 100 Mbit/s full duplex mode
- ▶ 10 Mbit/s half duplex mode, 10 Mbit/s full duplex mode

State on delivery: autonegotiation is activated with exception of the HIPER-Ring ports: 100 Mbit/s full duplex.

The socket housings are electrically connected to the lower covering.

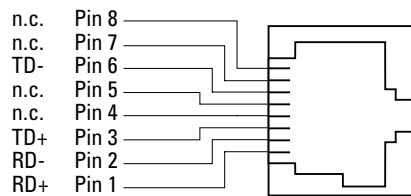


Fig. 14: Pin assignment of a TP/TX interface in MDI-X mode, RJ45 socket

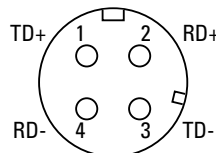


Fig. 15: Pin assignment of a TP/TX interface, M12 socket

■ 10/100/1000 Mbit/s twisted pair connection
 1000 Mbit/s twisted pair connection 1000 MBit/s twisted pair ports (RJ45 sockets) enable the connection of terminal devices or independent network segments in compliance with the IEEE 802-3, 2000 Edition 1000BASE-T standard. These ports support:

- ▶ autonegotiation
- ▶ autopolarity
- ▶ autocrossing (when autonegotiation is switched on)
- ▶ 1000 Mbit/s full duplex
- ▶ 100 Mbit/s half duplex, 100 Mbit/s full duplex,
- ▶ 10 Mbit/s half duplex, 10 Mbit/s full duplex.

State on delivery: autonegotiation.

The socket housing is electrically connected to the front panel.

The pin assignment corresponds to MDI-X.

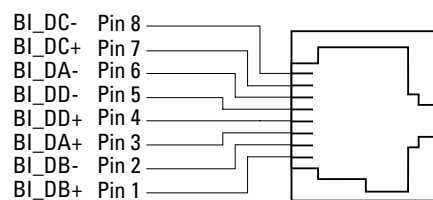


Fig. 16: Pin assignment of a 1000 MBit/s twisted pair interface

- 100 Mbit/s F/O connection
100 MBit/s F/O ports (MTRJ-, ST- or DSC) enable the connection of terminal devices or independent network segments in compliance with the IEEE 802.3 100BASE-FX standard. These ports support:
 - ▶ full and half duplex mode
 State on delivery: full duplex.

Note: Make sure, that you connctet LH ports only to LH ports, SM ports only to SM ports and MM ports only to MM ports.
- 1 Gbit/s F/O connection
1 Gbit/s F/O ports (LC sockets) enable the connection of terminal devices or independent network segments in compliance with the IEEE 802.3-2000 (ISO/IEC 8802-3:2000) 1000BASE-SX or 1000BASE-LX standard. These ports support:
 - ▶ autonegotiation,
 - ▶ full duplex mode
 State on delivery: autonegotiation.

Note: Make sure, that you connctet LH ports only to LH ports, SX ports only to SX ports and LX ports only to LX ports.
- AUI connection
AUI ports (Attachment Unit Interface) enable you to connect a terminal device via an AUI cable in accordance with IEEE 802.3-2002. These ports support:
 - ▶ SQE test
 - ▶ DTEPower monitor
 State on delivery: both functions not enabled.
 The housing of the Sub-D plug is electrically isolated from the lower panel of the device.

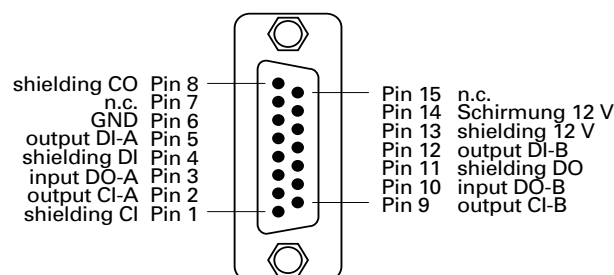


Fig. 17: Pin assignment of the AUI interface

Connect the ports of the media modules plugged into the basic module as required in order to set up your industrial ETHERNET or expand your existing network.

- ☐ Connect the data lines according to your requirements.

2.1.11 Assembling the MB - 2T expansion module

The expansion module MB-2T allows you to add 2 slots to the MS20-1600 and MS30-1602 basic modules for installing media modules. The MB-2T expansion module can be installed while in running operation.

- ☐ On the right side of the basic module, loosen the screw at the top and at the bottom (1-3 revolutions).
- ☐ Remove the side cover.
- ☐ If you have not yet done so, mount the basic module onto the DIN rail.
- ☐ Slide the MB2T expansion module on the DIN rail toward the basic module until the modules plug into each other.
- ☐ On the basic module, tighten the screws at the top and at the bottom.

2.1.12 Define the meaning of the display LEDs

You use the “SELECT” button on the basic module to define the meaning of the LEDs of the media modules. You press the button to switch to the next display meaning. The display status LEDs of the basic module show the current meaning of the port LEDs of the media modules.

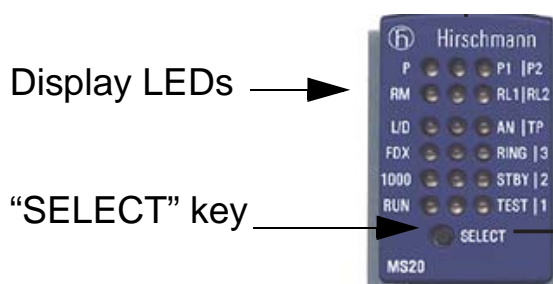
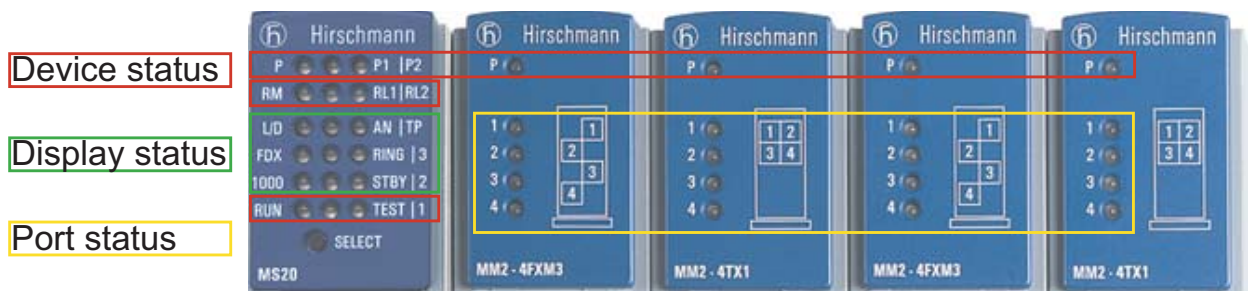


Fig. 18: “SELECT” key on the MICE basic modules

2.2 Displays

After applying the operating voltage, the software starts and initializes itself. The device then performs a selftest. Various LEDs light up in the process. The process lasts approximately 60 seconds.



■ Device status

These LED's provide information about conditions which affect the operation of the whole device.

P- Power (green LED)	Meaning
lit green	internal supply voltage on
not lit	internal supply voltage too low
P1 - Power 1 (green LED)	Meaning
lit green	supply voltage 1 on
not lit	supply voltage 1 under 18 V
P2 - Power 2 (green LED)	Meaning
lit green	supply voltage 2 on
not lit	supply voltage 2 under 18 V
RM - Redundancy Manager (green/yellow LED)	Meaning
lit green	RM function active, redundant port not active
lit yellow	RM function active, redundant Port active
not lit	RM function not active
flashes green	Incorrect configuration of the HIPER-Ring (e.g., the Ring is not connected to the ring port).
RUN - BOOT/RUN (green LED)	Meaning
lit green	System is ready for operation
flashes green	System booting
not lit	System in reset state
RL1 - Relay 1, signal contact (red/yellow LED)	Meaning
lit red	The signal contact 1 is open, i.e. it indicates an error
lit yellow	The signal contact 1 is open, the "manual setting" is active
not lit	The signal contact 1 is closed, i.e. it does not indicate an error
RL2 - Relay 2, signal contact (red/yellow LED)	Meaning
lit red	The signal contact 1 is open, i.e. it indicates an error
lit yellow	The signal contact 1 is open, the "manual setting" is active
not lit	The signal contact 1 is closed, i.e. it does not indicate an error

RUN, 1 - Display saving operations of the AutoConfiguration Adapter ACA	Meaning
blinking alternatively:	Error during memory operation.
blinking synchronously twice per second:	Loading the ACA configuration.
blinking synchronously once per second:	Saving the configuration in the ACA .

If the manual adjustment is active on the signal contact, then the error display is independent of the setting of the signal contact.

■ Display status

Each media module has one LED per port. The meaning of these port status LEDs depends on the setting on the basic module. The display meaning can be set with the "SELECT" button on the basic module.

- ☐ Press the button approximately two seconds to continue switching the meaning of the display. If the button is not pressed for approximately 20 seconds, the display status changes to "L/D."

L/D - Data, Link status (green LED)	Meaning
lit green	The port LEDs of the media modules display the connection status.
FDX - Full duplex (green LED)	Meaning
lit green	The port LEDs of the media modules display the connection type, full or half duplex.
1000 - 10/100/1000 Mbit/s (green LED)	Meaning
lit green	The port LEDs of the media modules indicate the transmission rate.
AN - Autonegotiation (green LED)	Meaning
lit green	The port LEDs of the media modules indicate the port configuration type
RING - Ring port (green LED)	Meaning
lit green	The port LEDs of the media modules indicate the HIPER-Ring assignment.
STBY - Stand by (green LED)	Meaning
lit green	The port LEDs of the media modules indicate the assignment to a redundant coupling of network segments.
TEST - LED test (green LED)	Meaning
lit green	<p>The test of the LEDs status, display status and port status is active.</p> <p>The LEDs P1/P2 light green.</p> <p>The status LED "RM" blinks green/yellow.</p> <p>The status LEDs "RELAY1/RELAY2" blinks yellow/red.</p> <p>The display status LEDs blink green.</p> <p>The port status LEDs of the media modules blink green/yellow.</p>

TP - Twisted pair / fiber optic (green LED)	Meaning
lit green	The port LEDs of the media modules display the media type.
All display status-LEDs (green LEDs)	Meaning
Running licht	Initialization phase after restart.
2, 3 (green LEDs)	Meaning
	Service LEDs

■ Portstatus

These LEDs display port-related information. Set the contents of the information with the button on the basic module. (see [“Display status” on page 32](#)).

1 to 4 - Data, link status (green/yellow LED)	Meaning
not lit	no valid connection no DTE voltage at the port (for MM3-2AUI).
lit green	valid connection DTE voltage at the port (for MM3-2AUI)
flashes green (1 time per second)	port is switched to stand-by (port 1).
flashes green (3 times per second)	port is disabled
flashes yellow	data reception at the specific port
1 to 4 - FDX (green/yellow LED)	Meaning
not lit	Half duplex is active
lit green	Full duplex is active
1 to 4 – 1000 (green/yellow LED)	Meaning
not lit	10 Mbit/s is active.
lit green	100 Mbit/s is active.
lit yellow	1000 Mbit/s is active.
1 to 4 – AUTONEG (green/yellow LED)	Meaning
lit green	Autonegotiation is active.
1 to 4 – RING PORT (green/yellow LED)	Meaning
lit green	This port belongs to the HIPER-Ring
1 to 4 – STAND-BY (green/yellow LED)	Meaning
lit green	Connection port for the data line
lit yellow	Connection port for the control line
flashes green/yellow	no Stand-by partner existing
TP/FO – Twisted pair / fiber optic (green/yellow LED)	Meaning
lit green	The port LEDs of the media modules display twisted pair ports
lit yellow	The port LEDs of the media modules display F/O ports

1 to 4 – LED TEST (green/yellow LED)	Meaning
not lit	LED defective.
flashes green/yellow	LED test is active.

2.3 Carrying out basic settings

IP addresses must be entered when the device is installed for the first time. The device provides 6 options for configuring the IP addresses:

- ▶ Entry via the V.24 connection.
- ▶ Entry by HiDiscovery protocol
- ▶ Configuration via BOOTP
- ▶ Configuration via DHCP
- ▶ Configuration via DHCP Option 82
- ▶ The AutoConfiguration Adapter

You will find a detailed description of the configuration in the “Basic Configuration User Manual” on the CD-ROM.

■ State of delivery

- ▶ IP address: The device looks for the IP address using DHCP
- ▶ Password for management:
user, password: public (read only)
admin, password: private (read and write)
- ▶ V.24 data rate: 9.600 baud
- ▶ Ring redundancy: on
Ring ports on 100 Mbit full duplex or 1000 Mbit autonegotiation
- ▶ Ethernet ports: Link status is not evaluated (signal contact)
- ▶ Optical 100 Mbit ports: 100 Mbit full duplex
All other ports: autonegotiation
- ▶ Redundancy manager switched off
- ▶ Stand-by coupling off

■ USB interface

The USB socket offers an interface for the local connection of an Auto-Configuration Adapter ACA 21-USB. It is a device for saving/loading the configuration and for loading the software.

Pin number	Signal name
1	VCC
2	- Data
3	+ Data
4	Ground

■ V.24 interface (external management)

A serial interface is provided on the RJ11 socket (V.24 interface) for the local connection of an external management station (VT100 terminal or PC with appropriate terminal emulation) or an AutoConfiguration Adapter ACA 11. This makes it possible to establish a connection to the Command Line Interface CLI and to the system monitor.

VT 100 terminal settings

Speed	9.600 baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The socket housing is electrically connected to the front cover of the device.

The V.24 interface is electrically connected to the supply voltage.

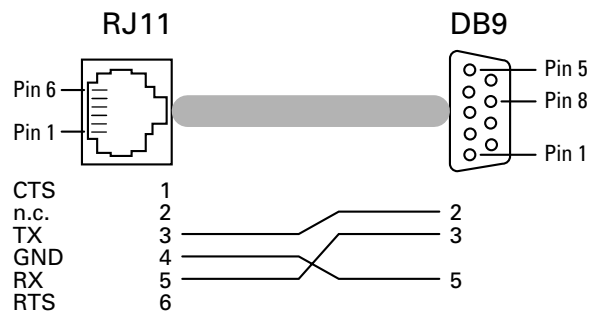


Fig. 19: Pin assignment of the V24 interface

Note: In chapter [“Technical data” on page 37 ff](#) you find the order number for the terminal access cable which is to be ordered separately.

2.4 Disassembling

■ Disassembling the device

- ☐ In order to remove the device from the DIN rail, press it downward and pull it out from under the DIN rail.

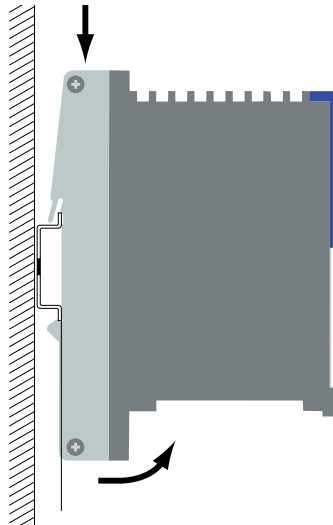


Fig. 20: Disassembling the device

■ Disassembling the SFP modules

- ☐ Pull the SFP module on the opened lock out off the socket.
- ☐ Close the socket with the protective cap.



Fig. 21: Disassembling the SFP module

3 Technical data

■ General data

Dimensions	MS20-0800...	125 mm x 133 mm x 100 mm (140 mm ¹⁾)
W x H x D	MS30-0802...	163 mm x 133 mm x 100 mm (140 mm ¹⁾)
	MS20-1600...	202 mm x 133 mm x 100 mm (140 mm ¹⁾)
	MS30-1602...	240 mm x 133 mm x 100 mm (140 mm ¹⁾)
	MS20-2400...	278 mm x 133 mm x 100 mm (140 mm ¹⁾)
	MS30-2402...	316 mm x 133 mm x 100 mm (140 mm ¹⁾)
Weight	MS20-0800...	610 g (700 g ¹⁾)
	MS30-0802...	740 g (830 g ¹⁾)
	MS20-1600...	880 g (970 g ¹⁾)
	MS30-1602...	1010 g (1100 g ¹⁾)
	MS20-2400...	1030 g (1120 g ¹⁾)
	MS30-2402...	1160 g (1250 g ¹⁾)
Voltage supply	Operating voltage	18 to 32 V DC (voltage range A) or 18 to 60 V DC (voltage range C) safety extra-low voltage (SELV/PELV), redundant inputs decoupled. Relevant for North America: Nec Class 2 power source 5 A maximum.
Overload current protection at input		non-changeable fuse
Isolation voltage between operating voltage and hou- sing		800 V
Surrounding	Storage temperature (surrounding air)	Standard: -40 °C to +70 °C Extended: -40 °C to +85 °C
	Humidity	10% to 95% (non condensing)
	Atmospheric pressure	up to 2.000 m (795 hPa), higher altitudes on demand
Operating tempe- rature	Standard	0 °C to +60 °C
	Extended	-40 °C to +70 °C
Pollution degree		2
Protection types	Laser protection	Class 1 conforming to EN 60825-1 (2001)
	Protection types	IP 20

¹⁾ At 48 VDC power supply (voltage range C (18...60 VDC),
see table [“Combination options of the MS20/MS30 device versions” on page 13](#))

■ EMV and stability

EMV interference proof		A ¹⁾	B ¹⁾
EN 61000-4-2	Discharge of static electricity		
	Contact discharge: test level 3	4 kV	8 kV
	Air discharge: test level 3	8 kV	15 kV
EN 61000-4-3	Electromagnetic fields		
	Test level 3 (80 - 2000 MHz)	10 V/m	20 V/m

EMV interference proof		A ¹⁾	B ¹⁾
EN 61000-4-4	Fast transients (burst), test level 3, x - Power line - Data line	2 kV 1 kV	4 kV 4 kV
EN 61000-4-5	Surge voltage - Power line, line/line: test level 2 - Power line, line/earth: test level 3 - Data line: test level 3	0,5 kV 1 kV 1 kV	1 kV 2 kV 2 kV
EN 61000-4-6	Cable-based RF faults, test level 3 10 kHz - 150 kHz 150 kHz - 80 MHz	3 V 10 V	3 V 10 V
EN 61000-4-9	Impulse-shaped magnetic fields; test level 4	-	300 A/m
EMV emitted immunity			
EN 55022	Class A	Yes	Yes
FCC 47 CFR Part 15	Class A	Yes	Yes
Germanischer Lloyd	Rules for Classification and Construction VI - 7 - 3 Part 1, Ed. 2001	-	Yes
Stability			
Vibration	IEC 60068-2-6 Test FC, testing level in line with IEC 61131-2	Yes	Yes
	Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	-	Yes
	IEC 870-2-2 Table 3 Normal Installation in line with EN61850-3	-	Yes
Shock	IEC 60068-2-27 Test Ea, testing level in line with IEC 61131-2	Yes	Yes
	IEC 870-2-2 Table 3 Normal Installation in line with EN61850-3	-	Yes

¹⁾ Product code A: Certification = CE, UL
Product code B: Certification = CE, UL, GL, Railway, Sub Station, see
["Combination options of the MS20/MS30 device versions" on page 13](#)

■ Network size

AUI port	
Length of a AUI cable	50 m maximum

Table 6: AUI port

Length of a twisted pair segment	
100 m approx.	cat5e cable with 1000BASE-TX

Table 7: TP port 10BASE-T / 100BASE-TX / 1000BASE-T

Product code	Wave length	Fiber	System attenuation	Expansion	Fiber data	
-M2, -M4	MM	1300 nm	50/125 μm	0-8 dB	0-5 km	1.0 dB/km, 800 MHz*km
-M2, -M4	MM	1300 nm	62,5/125 μm	0-11 dB	0-4 km	1.0 dB/km, 500 MHz*km
-S2	SM	1300 nm	9/125 μm	0-16 dB	0-30 km	0.4 dB/km; 3,5 ps/(nm*km)
-L2	LH	1550 nm	9/125 μm	7-29 dB	24-86 km	0.3 dB/km; 19 ps/(nm*km)

Table 8: F/O port 100BASE-FX

Product code	Wave length	Fiber	System attenuation	Expansion	Fiber data	
-SX/LC	MM	850 nm	50/125 µm	0-7,5 dB	0-550 m	1.0 dB/km, 800 MHz*km
-LX/LC	SM	1310 nm ¹⁾	50/125 µm	0-11 dB	0-550 m	1.0 dB/km, 800 MHz*km
-SX/LC	MM	850 nm	62,5/125 µm	0-7,5 dB	0-275 m	1.0 dB/km, 500 MHz*km
-LX/LC	SM	1310 nm ¹⁾	62,5/125 µm	0-11 dB	0-550 m	1.0 dB/km, 500 MHz*km
-LX/LC	SM	1310 nm ¹⁾	9/125 µm	0-11 dB	0-20 km	0.4 dB/km; 3,5 ps/(nm*km)
-LH/LC	LH	1550 nm	9/125 µm	6-22 dB	8-72 km	0.25 dB/km; 19 ps/(nm*km)
-LH+/LC	LH	1550 nm	9/125 µm	15-32 dB	60-120 km	0.25 dB/km; 19 ps/(nm*km)

Table 9: F/O port 1000BASE-FX

MM = multimode

SM = singlemode

LH = singlemode longhaul

¹⁾ with F/O adapter in line with IEEE 802.3-2002 clause 38 (single-mode fiber offset-launch mode conditioning patch cord)

■ Power consumption/power output , temperature range and order numbers

Order numbers of the MICE basic modules see table [“Combination options of the MS20/MS30 device versions”](#) on page 13.

Basic module	Operating temperature, surrounding air	Basic module	Power consumption	Power output	Operating voltage
MS20-0800S...	0 °C to +60 °C	MS20-0800...A...	5.0 W	17.1 Btu (IT)/h	18...32 VDC
MS20-0800E...	-40 °C to +70 °C	MS20-0800...C...	7.4 W	25.4 Btu (IT)/h	18...60 VDC
MS30-0802S...	0 °C to +60 °C	MS30-0802...A...	5.6 W	19.2 Btu (IT)/h	18...32 VDC
MS30-0802E...	-40 °C to +70 °C	MS30-0802...C...	8.6 W	29.6 Btu (IT)/h	18...60 VDC
MS20-1600S...	0 °C to +60 °C	MS20-1600...A...	12.0 W	40.0 Btu (IT)/h	18...32 VDC
MS20-1600E...	-40 °C to +70 °C	MS20-1600...C...	15.6 W	52.5 Btu (IT)/h	18...60 VDC
MS30-1602S...	0 °C to +60 °C	MS30-1602...A...	12.6 W	41.1 Btu (IT)/h	18...32 VDC
MS30-1602E...	-40 °C to +70 °C	MS30-1602...C...	16.8 W	56.7 Btu (IT)/h	18...60 VDC
MS20-2400S...	0 °C to +60 °C	MS20-2400...A...	12.0 W	40.0 Btu (IT)/h	18...32 VDC
MS20-2400E...	-40 °C to +70 °C	MS20-2400...C...	16.8 W	56.7 Btu (IT)/h	18...60 VDC
MS30-2402S...	0 °C to +60 °C	MS30-2402...A...	12.6 W	42.1 Btu (IT)/h	18...32 VDC
MS30-2402E...	-40 °C to +70 °C	MS30-2402...C...	18.0 W	60.9 Btu (IT)/h	18...60 VDC

Media module	Power consumpt.	Power output	Operating temp., surrounding air	Order number
MICE 2000 media modules :				
MM2 - 2FLM4	2.6 W	8.9 Btu (IT)/h	0 °C to +55 °C	943 734-001
MM2 - 4TX1	0.8 W	2.8 Btu (IT)/h	0 °C to +60 °C	943 722-001
MM2 - 4TX1 - EEC	0.8 W	2.8 Btu (IT)/h	-25 °C to +60 °C	943 722-051
MM2 - 2FXP4	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 842-001
MM2 - 4FXM3	7.0 W	23.9 Btu (IT)/h	0 °C to +50 °C	943 721-001
MM2 - 2FXM3 / 2TX1	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 720-001
MM2 - 2FXM2	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 718-001
MM2 - 2FXS2	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 719-001
MICE 3000 media modules:				
MM3 - 2AUI	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 840-001
MM3 - 4FLM4	5.0 W	17.1 Btu (IT)/h	0 °C to +55 °C	943 760-001
MM3 - 2FLM4 / 2TX1 - RT	5.0 W	17.1 Btu (IT)/h	0 °C to +55 °C	943 117-004
MM3 - 4TX5	0.8 W	2.8 Btu (IT)/h	0 °C to +60 °C	943 841-001
MM3 - 4TX1 - RT	0.8 W	2.8 Btu (IT)/h	0 °C to +55 °C	943 117-001
MM3 - 4FXP4	7.0 W	23.9 Btu (IT)/h	0 °C to +55 °C	943 843-001
MM3 - 1FXM2 / 3TX1	2.2 W	7.5 Btu (IT)/h	0 °C to +55 °C	943 839-001
MM3 - 1FXM2 / 3TX1 - EEC	2.2 W	7.5 Btu (IT)/h	-25 °C to +60 °C	943 839-051
MM3 - 2FXM2 / 2TX1	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 761-001
MM3 - 2FXM2 / 2TX1 - EEC	3.4 W	11.6 Btu (IT)/h	-25 °C to +60 °C	943 761-051
MM3 - 2FXM2 / 2TX1 - RT	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 117-002
MM3 - 2FXM4 / 2TX1	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 837-001
MM3 - 4FXM2	7.0 W	23.9 Btu (IT)/h	0 °C to +55 °C	943 764-001
MM3 - 4FXM4	7.0 W	23.9 Btu (IT)/h	0 °C to +55 °C	943 835-001
MM3 - 1FXS2 / 3TX1	2.2 W	7.5 Btu (IT)/h	0 °C to +55 °C	943 838-001
MM3 - 2FXS2 / 2TX1	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 762-001
MM3 - 2FXS2 / 2TX1 - RT	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 117-003
MM3 - 4FXS2	7.0 W	23.9 Btu (IT)/h	0 °C to +55 °C	943 836-001
MM3 - 1FXL2 / 3TX1	3.4 W	11.6 Btu (IT)/h	0 °C to +55 °C	943 763-001
MICE 4000 media modules:				
MM4 - 4TX / SFP	9.0 W	30.8 Btu (IT)/h	0 °C to +60 °C	943 010-001
MM4 - 2TX / SFP	5.8 W	19.8 Btu (IT)/h	0 °C to +60 °C	943 622-001
Expansion/SFP modules:				
M - SFP - SX / LC	0 W	0 Btu (IT)/h	0 °C to +60 °C	943 014-001
M - SFP - LX / LC	0 W	0 Btu (IT)/h	0 °C to +60 °C	943 015-001
M - SFP - LH / LC	0 W	0 Btu (IT)/h	0 °C to +60 °C	943 042-001
M - SFP - LH+ / LC	0 W	0 Btu (IT)/h	0 °C to +60 °C	943 049-001
MB - 2T	0 W	0 Btu (IT)/h	0 °C to +60 °C	943 733-002

■ Interfaces

MICE MS20-..., MS30-...	V.24 Port: external management, AutoConfiguration Adapter ACA 11 2 terminal blocks: 1 x indicator contact each, 1 A maximum, 24 V 1 x voltage supply each USB: ACA 21-USB
MICE 2000 media modules	see page 17

MICE 3000 media modules	see page 18
MICE 4000 media modules	see page 19

■ Scope of delivery

Device	Scope of delivery
MICE	MS20-.../MS30-... device
MS20-.../MS30-...	2 terminal blocks for supply voltage and indicator contact
	CD-ROM with manual
	ML-MS2/MM lables
	description and operating instructions

■ Accessories

Name	Order number
Manual Basics Industrial ETHERNET and TCP/IP	280 720-834
AutoConfiguration Adapter ACA 21-USB	943 271-001
Terminal cable	943 301-001
4-pin terminal block (50 units)	943 845-004
Rail Power Supply RPS 30	943 662-003
Rail Power Supply RPS 60	943 662-001
Rail Power Supply RPS 120	943 662-011
ML-MS2/MM lables	943 767-001
ML-MS3 lables	943 768-001
Network management software HiVision	943 471-100
OPC-Server software HiOPC	943 055-001

■ Based specifications and standards

EN 61000-6-2:2001	Generic standards – Immunity for industrial environments
EN 55022:1998 + A1 2000 + A2-2003	Information technology equipment – Radio disturbance characteristics
EN 60950:2001	Safety of Information Technology Equipment (ITE)
EN 61131-2:2000	Programmable Controllers
EN 50121-4:2000	Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems
FCC 47 CFR Part 15:2003	Code of Federal Regulations
Germanischer Lloyd	Rules for Classification and Construction VI - 7 - 3 Part 1, Ed. 2001
cUL 508:1998	Safety for Industrial Control Equipment
cUL 1604	Electrical Equipment for Use in Class I and Class II, Div.2 and Class III Hazardous (Classified) Locations
EN 50155	Declaration (Railway)
EN 61850-3	Communications networks and systems in stations
IEEE 1613	Standard Environment and Testing Requirements for Communication Networking Devices in Electric Power Substations

*Table 10: List of based specifications and standards
Certified devices are marked with a certification identifier.*

RFC 768	UDP	RFC 1769	SNTP
RFC 783	TFTP	RFC 1907	MIB2
RFC 791	IP	RFC 1945	HTTP/1.0
RFC 792	ICMP	RFC 2131	DHCP
RFC 793	TCP	RFC 2132	DHCP-Options
RFC 826	ARP	RFC 2236	IGMPv2
RFC 951	BOOTP	RFC 2239	MAU-MIB
RFC 1112	IGMPv1	RFC 3411	SNMP Framework
RFC 1157	SNMPv1	RFC 3412	SNMP MPD
RFC 1155	SMIv1	RFC 3413	SNMP Applications
RFC 1213	MIB2	RFC 3414	SNMP USM
RFC 1493	Dot1d	RFC 3415	SNMP VACM
RFC 1542	BOOTP-Extensions	RFC 2613	SMON
RFC 1757	RMON	RFC 2674	Dot1p/Q

Table 11: List of RFCs

IEEE 802.1 D	Switching, GARP, GMRP, Spanning Tree
IEEE 802.1 D-1998	Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP)
IEEE 802.1 Q	Tagging
IEEE 802.1 Q-1998	Virtual Bridged Local Area Networks (VLAN Tagging, GVRP)
IEEE 802.1 w.2001	Rapid Reconfiguration
IEEE 802.3-2002	Ethernet

Table 12: List of IEEE standards

■ Certifications

The following table shows the status of the certifications of the MICE product family.

Standard	MS20/MS30
cUL 508 / CSA C22.2 No.142	pending
cUL 1604 / CSA C22.2 No.213	pending
Germanischer Lloyd	pending

Table 13: Certifications, actual state see www.hirschmann.com

** without MM3 - 2AUI*

Further support

■ Technical questions and training courses

In the event of technical queries, please talk to the Hirschmann contract partner responsible for looking after your account or directly to the Hirschmann office. You can find the addresses of our contract partners on the Internet:

<http://www.hirschmann.com>

Our support line is also at your disposal:

► Tel. +49(1805) 14-1538

► Fax +49(7127) 14-1551

Answers to Frequently Asked Questions can be found on the Hirschmann internet site www.hirschmann.com/faq

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- Consulting incorporates comprehensive technical advice, from system evaluation through network planning to project planning.
- Training offers you an introduction to the technological fundamentals, product briefing and user training with certification.
- Support ranges from commissioning through the standby service to maintenance concepts.

With the Competence Center, you firmly rule out any compromise: the client-specific package leaves you free to choose the service components that you will use.

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